TEST PAPER OF JEE(MAIN) EXAMINATION – 2019

(Held On Thursday 10th JANUARY, 2019) TIME : 9 : 30 AM To 12 : 30 PM

CHEMISTRY

1. Two pi and half sigma bonds are present in:

(1) N_2^+ (2) N_2 (3) O_2^+ (4) O_2

Ans. (1)

2. The chemical nature of hydrogen preoxide is :-

(1) Oxidising and reducing agent in acidic medium, but not in basic medium.

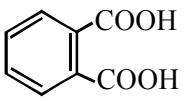
(2) Oxidising and reducing agent in both acidic and basic medium

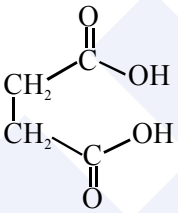
(3) Reducing agent in basic medium, but not in acidic medium

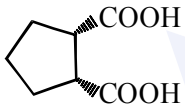
(4) Oxidising agent in acidic medium, but not in basic medium.

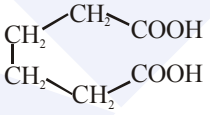
Ans. (2)

3. Which dicarboxylic acid in presence of a dehydrating agent is least reactive to give an anhydride :

(1) 

(2) 

(3) 

(4) 

Ans. (4)

4. Which premitive unit cell has unequal edge lenghs ($a \neq b \neq c$) and all axial angles different from 90° ?

(1) Tetragonal (2) Hexagonal

(3) Monoclinic (4) Triclinic

Ans. (4)

5. Wilkinson catalyst is :

(1) $[(Ph_3P)_3RhCl]$ (Et = C_2H_5)

(2) $[Et_3P)_3IrCl]$

(3) $[Et_3P)_3RhCl]$

(4) $[Ph_3P)_3IrCl]$

Ans. (1)

6. The total number of isotopes of hydrogen and number of radioactive isotopes among them, respectively, are :

(1) 2 and 0

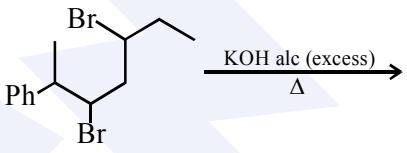
(2) 3 and 2

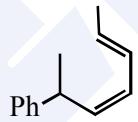
(3) 3 and 1

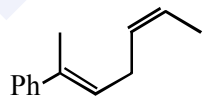
(4) 2 and 1

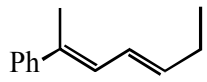
Ans. (3)

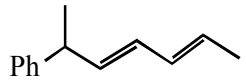
7. The major product of the following reaction is



(1) 

(2) 

(3) 

(4) 

Ans. (3)

8. The total number of isomers for a square planar complex $[M(F)(Cl)(SCN)(NO_2)]$ is :

(1) 12 (2) 8 (3) 16 (4) 4

Ans. (1)

9. Hall-Heroult's process is given by "

(1) $Cr_2O_3 + 2Al \rightarrow Al_2O_3 + 2Cr$

(2) $Cu^{2+}(aq.) + H_2(g) \rightarrow Cu(s) + 2H^+(aq)$

(3) $ZnO + C \xrightarrow{Coke,1673K} Zn + CO$

(4) $2Al_2O_3 + 3C \rightarrow 4Al + 3CO_2$

Ans. (4)

10. The value of K_p/K_C for the following reactions at 300K are, respectively :

(At 300K, RT = 24.62 $dm^3atm\ mol^{-1}$)

$N_2(g) + O_2(g) \rightleftharpoons 2NO(g)$

$N_2O_4(g) \rightleftharpoons 2NO_2(g)$

$N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g)$

(1) 1, 24.62 $dm^3atm\ mol^{-1}$, 606.0 $dm^6atm^2mol^{-2}$

(2) 1, 4.1×10^{-2} $dm^{-3}atm^{-1}\ mol^{-1}$, 606.0 $dm^6\ atm^2\ mol^{-2}$

(3) 606.0 $dm^6atm^2mol^{-2}$, 1.65×10^{-3} $dm^3atm^{-2}\ mol^{-1}$

(4) 1, 24.62 $dm^3atm\ mol^{-1}$, 1.65×10^{-3} $dm^{-6}atm^{-2}\ mol^2$

Ans. (4)

11. If dichloromethane (DCM) and water (H_2O) are used for differential extraction, which one of the following statements is correct ?

(1) DCM and H_2O would stay as lower and upper layer respectively in the S.F.

(2) DCM and H_2O will be miscible clearly

(3) DCM and H_2O would stay as upper and lower layer respectively in the separating funnel (S.F.)

(4) DCM and H_2O will make trubid/colloidal mixture

Ans. (1)

12. The type of hybridisation and number of lone pair(s) of electrons of Xe in $XeOF_4$, respectively, are :

(1) sp^3d and 1

(2) sp^3d and 2

(3) sp^3d^2 and 1

(4) sp^3d^2 and 2

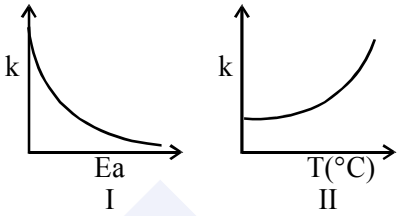
Ans. (3)

13. The metal used for making X-ray tube window is :

(1) Mg (2) Na (3) Ca (4) Be

Ans. (4)

14. Consider the given plots for a reaction obeying Arrhenius equation (0°C < T < 300°C) : (k and E_a are rate constant and activation energy, respectively)



Choose the correct option :

(1) Both I and II are wrong

(2) I is wrong but II is right

(3) Both I and II are correct

(4) I is right but II is wrong

Ans. (4)

15. Water filled in two glasses A and B have BOD values of 10 and 20, respectively. The correct statement regarding them, is :

(1) A is more polluted than B

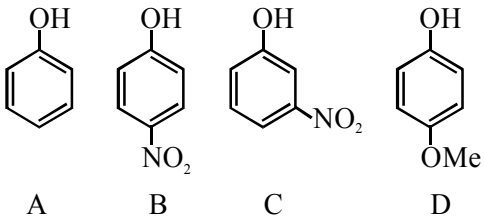
(2) A is suitable for drinking, whereas B is not

(3) B is more polluted than A

(4) Both A and B are suitable for drinking

Ans. (3)

16. The increasing order of the pKa values of the following compounds is :



(1) D < A < C < B (2) B < C < D < A

(3) C < B < A < D (4) B < C < A < D

Ans. (4)

17. Liquids A and B form an ideal solution in the entire composition range. At 350 K, the vapor pressures of pure A and pure B are 7×10^3 Pa and 12×10^3 Pa, respectively. The composition of the vapor in equilibrium with a solution containing 40 mole percent of A at this temperature is :

(1) $x_A = 0.37$; $x_B = 0.63$

(2) $x_A = 0.28$; $x_B = 0.72$

(3) $x_A = 0.76$; $x_B = 0.24$

(4) $x_A = 0.4$; $x_B = 0.6$

Ans. (2)

18. Consider the following reduction processes :

$Zn^{2+} + 2e^- \rightarrow Zn(s)$; $E^\circ = -0.76$ V

$Ca^{2+} + 2e^- \rightarrow Ca(s)$; $E^\circ = -2.87$ V

$Mg^{2+} + 2e^- \rightarrow Mg(s)$; $E^\circ = -2.36$ V

$Ni^{2+} + 2e^- \rightarrow Ni(s)$; $E^\circ = -0.25$ V

The reducing power of the metals increases in the order :

(1) Ca < Zn < Mg < Ni

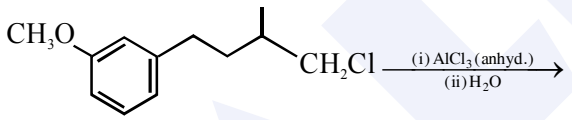
(2) Ni < Zn < Mg < Ca

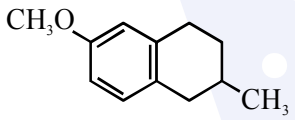
(3) Zn < Mg < Ni < Ca

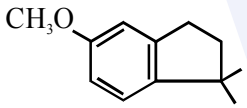
(4) Ca < Mg < Zn < Ni

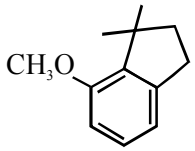
Ans. (2)

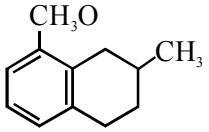
19. The major product of the following reaction is:



(1) 

(2) 

(3) 

(4) 

Ans. (2)

20. The electronegativity of aluminium is similar to :

(1) Boron

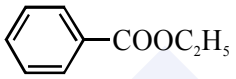
(2) Carbon

(3) Lithium

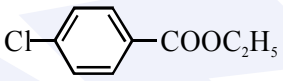
(4) Beryllium

Ans. (4)

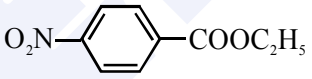
21. The decreasing order of ease of alkaline hydrolysis for the following esters is :



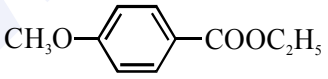
I



II



III



IV

(1) IV > II > III > I

(2) III > II > I > IV

(3) III > II > IV > I

(4) II > III > I > IV

Ans. (2)

22. A process has $\Delta H = 200$ $Jmol^{-1}$ and $\Delta S = 40$ $JK^{-1}mol^{-1}$. Out of the values given below, choose the minimum temperature above which the process will be spontaneous :

(1) 5 K

(2) 4 K

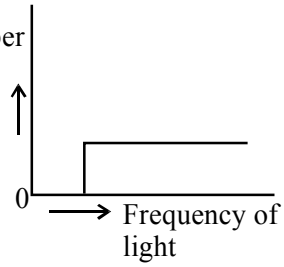
(3) 20 K

(4) 12 K

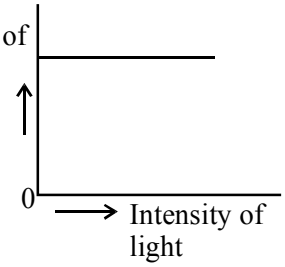
Ans. (1)

23. Which of the graphs shown below does not represent the relationship between incident light and the electron ejected form metal surface ?

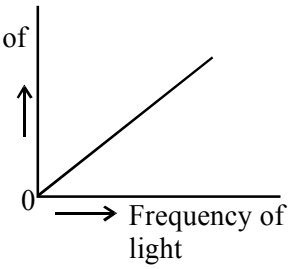
(1)



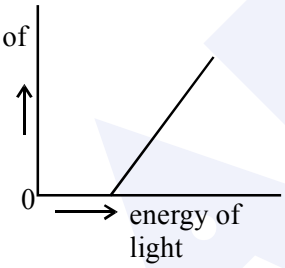
(2)



(3)



(4)



Ans. (3)

24. Which of the following is not and example of heterogeneous catalytic reaction ?

(1) Ostwald's process
(2) Haber's process
(3) Combustion of coal
(4) Hydrogenation of vegetable oils

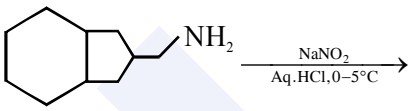
Ans. (3)

25. The effect of lanthanoid contraction in the lanthanoid series of elements by and large means :

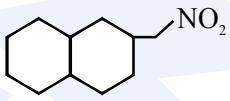
(1) decrease in both atomic and ionic radii
(2) increase in atomic radii and decrease in ionic radii
(3) increase in both atomic and ionic radii
(4) decrease in atomic radii and increase in ionic radii

Ans. (1)

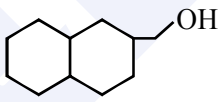
26. The major product formed in the reaction given below will be :



(1)



(2)



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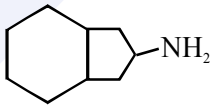
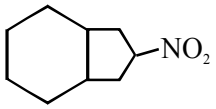


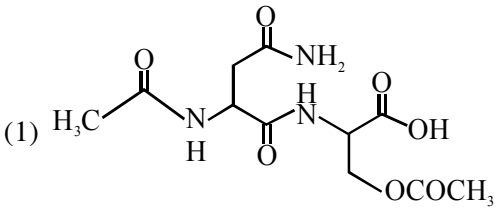
(4)

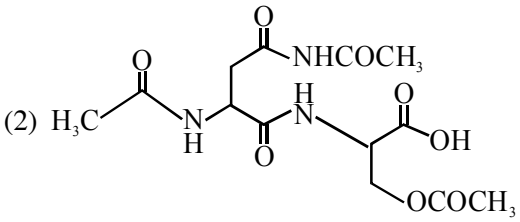


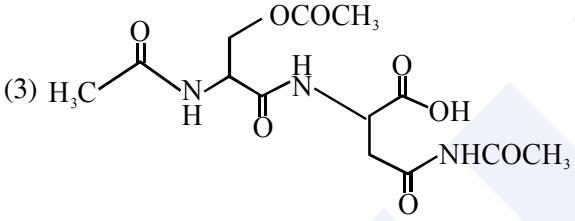
Ans. (Bonus)

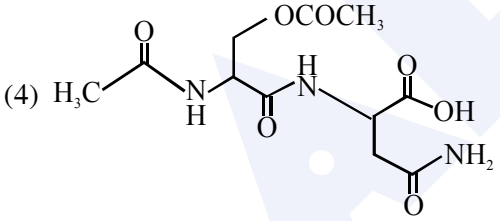
27. The correct structure of product 'P' in the following reaction is :

Asn-Ser + $\underset{\text{(excess)}}{(CH_3CO)_2O} \xrightarrow{NEt_3}$ P

(1) 

(2) 

(3) 

(4) 

Ans. (1)

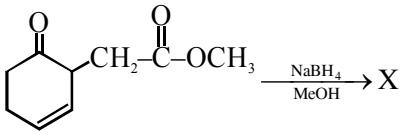
28. Which hydrogen in compound (E) is easily replaceable during bromination reaction in presence of light :

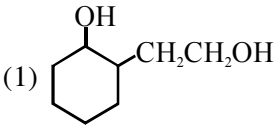
$\underset{\delta}{CH_3}-\underset{\gamma}{CH_2}-\underset{\beta}{CH}=\underset{\alpha}{CH_2}$

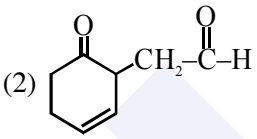
(1) β – hydrogen
(2) γ – hydrogen
(3) δ – hydrogen
(4) α – hydrogen

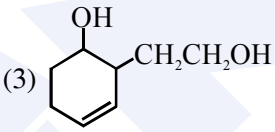
Ans. (2)

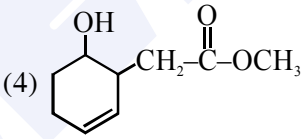
29. The major product 'X' formed in the following reaction is :



(1) 

(2) 

(3) 

(4) 

Ans. (4)

30. A mixture of 100 m mol of $Ca(OH)_2$ and 2g of sodium sulphate was dissolved in water and the volume was made up to 100 mL. The mass of calcium sulphate formed and the concentration of OH^- in resulting solution, respectively, are : (Molar mass of $Ca(OH)_2$, Na_2SO_4 and $CaSO_4$ are 74, 143 and 136 g mol^{-1}, respectively; K_{sp} of $Ca(OH)_2$ is 5.5×10^{-6})

(1) 1.9 g, 0.14 mol L^{-1}
(2) 13.6 g, 0.14 mol L^{-1}
(3) 1.9 g, 0.28 mol L^{-1}
(4) 13.6 g, 0.28 mol L^{-1}

Ans. (3)